

How environments can threaten academic performance, self-knowledge, and sense of belonging

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“Like many other Blacks,” recounted African American tennis great Arthur Ashe, “when I find myself in a new public situation, I will count” (Ashe, 1993, p. 131). Ashe—who played a sport that was and still is dominated by Whites—counted his “Blackness” frequently. By “counting”, Ashe was referring to the difficulty he encountered as a member of a group that is outnumbered and devalued in American society; he counted the number of Black faces in a room to determine how well his social identity was valued and represented. It turns out that many of us engage in a similar, albeit less conscious, form of mental arithmetic. We scan the environment and “count” those features about ourselves that stand out. When those features are related to a stigmatized social identity, we, like Ashe, may be distressed and burdened by negative stereotypes associated with our identity. For the past few years, our research

has focused on the burdens of being immersed in environments that compel us to count our social identity—borne not only by African Americans, but by anyone who is the target of stereotypes based on race, gender, sexual orientation, or religious affiliation. Much of this research has focused on what we call threatening environments, which are environments that can activate social identities and the relevant negative stereotypes about them. The aim of this chapter is to describe this research, and in so doing, illustrate what it means to belong to a group with a “spoiled identity” (Goffman, 1963).

Although individuals belonging to stigmatized groups now occupy positions in schools, employment settings, and legislative bodies that were once reserved for White men, research continues to paint a discouraging portrait of under-representation for them. Women, for example, still comprise only 38% of faculty in American universities, 16% of the corporate officers in America’s largest companies, and 13% of senators in the 107th US Congress (Business and Professional Women/USA, 2003). Observations about people of color show a similar pattern of under-representation. Clearly, these individuals are immersed in social milieus compelling them to “count” their social identities and the stereotypes associated with them (McGuire, McGuire, Child, & Fujioka, 1978). Being outnumbered, though, is not the only way environments activate social identities and stereotypes. Hearing about the latest reality TV show with 20 beautiful women chasing after a rich bachelor, watching a commercial showing a woman getting excited about a kitchen cleaner, or even taking a class with a White instructor are all ways the environment can conspire to make us think about our social identities.

So what are the effects of being in environments that compel us to “count” our group? How does a salient social identity affect the way we behave, feel, and think? These questions are important because our world is increasingly becoming a mosaic of different cultures, races, and religions, and so introduces environments that regularly make us think about our identities and their associated stereotypes.

In this chapter we explore how social factors can create threatening environments and come to affect intellectual performance, academic self-concept, and feelings of belonging. First, we review research showing how being in the numerical minority can impact intellectual performance. We describe, for example, how being outnumbered by Whites can activate negative race stereotypes and undermine African-Americans’ standardized test performance through a psychological process known as stereotype threat. Second, we explore how specific environments can make people apprehensive about being the targets of prejudice, which in turn can pose problems for their academic self-concepts. That is, we will show how viewing the world through the lens of social identity—or being in

environments that compel one to do so—can rob people of valuable self-relevant information and so foster inaccurate self-knowledge and an unstable self-concept. Third, we examine how threatening environments convey exclusionary messages by signaling that certain groups have only marginal status in the setting and so are not as valued as other groups. In so doing, these settings can hamper feelings of belonging, acceptance, and comfort, especially when they communicate that ability and intelligence are fixed qualities. Finally, we discuss what we can do to disarm these harmful environments so that people can succeed and prosper in them. Specifically, we suggest that we can inure people against the threatening features of an environment by convincing them that ability and intelligence are malleable. We begin by introducing the concept of threatening environments.

THREATENING ENVIRONMENTS

Threatening environments can be thought of as settings where people come to suspect that they could be devalued, stigmatized, or discriminated against because of a particular social identity. These settings compel individuals to think about their particular social identities and, in addition, the stereotypes associated with them. For individuals belonging to stigmatized groups, these stereotypes are negative, and any cues that signal that one's group is treated with ill will, is not valued socially, or is marginalized in any way, should increase one's vigilance for prejudice, foster mistrust, and create a threatening environment (Steele, Spencer, & Aronson, 2002). After watching the film *White Men Can't Jump*, for example, a normal game of pick-up may become threatening to a White basketball player playing with his Black friends (e.g. Stone, Lynch, Sjomeling, & Darley, 1999). Similarly, the boardroom may become threatening for a woman executive who becomes aware that the corporation she works for values men more than women and hires them almost exclusively (e.g. Kray, Thompson, & Galinsky, 2001). Once people belonging to stigmatized groups start thinking about their social identities in such threatening contexts, these thoughts can trigger a chain of events leading to underperformance, feelings of rejection, and feelings of doubt about why they receive the outcomes they do.

Settings that include people from more than one social group—heterogeneous ones—may be particularly likely to form threatening environments among the stigmatized. This may be especially true for settings where stigmatized groups are outnumbered by the more dominant group, as is the case, say, for an African-American med-student who

finds herself outnumbered by her White classmates. According to distinctiveness theory (McGuire et al., 1978), we are selective self-perceivers and attend to those aspects of ourselves that are distinct and peculiar in our immediate social context. Thus, our med-student will tend to notice and think about her “Blackness” in her White classroom, but in a different setting, say a class full of men, her race loses salience and she will become more conscious of being a woman. In one study, McGuire and his colleagues (McGuire, et al., 1978) found that high school students were more likely to spontaneously self-define as a member of their racial group when that group formed a minority rather than a majority in their classrooms. Further, this feeling of distinctiveness increased as the proportion of their race decreased in the classroom (cf. McGuire, McGuire, & Winton, 1979). And when people feel distinct, they may feel self-conscious. For example, when asked to imagine that they were taking an oral exam in front of a group that was of a different race, African-Americans responded that they would feel uncomfortable being seen as a representative of their group (as cited in Thompson and Sekaquaptewa, 2002). Mixed-group settings, then, can compel people to “count” and become aware of the representation of their group, and this tendency becomes more marked when people need only a few fingers to do so.

Environments can also become threatening by dint of stereotype activation. When members of stigmatized groups are outnumbered, they tend to notice their social identity; and once this happens, they may start ruminating about the stereotypes about their group. Inzlicht, Aronson, Good, and McKay (2004), for example, discovered that Black participants were more likely to think about stereotypes about their race when Whites outnumbered them. In their study, Black participants took a test with two other people—two other Blacks, two Whites, or one Black and one White. Before taking the test, participants completed a measure of stereotype activation, which consisted of 36 word fragments, twelve of which could be completed with, among other words, words associated with the African American stereotype (e.g., B R _ _ _ _ [BROTHER], or W E L _ _ _ _ [WELFARE]). The premise behind this task is that participants for whom the Black stereotype is activated should be more likely to make stereotypic completions than participants for whom the stereotype is not activated (Gilbert & Hixon, 1991; Steele & Aronson, 1995). In accordance with distinctiveness theory (McGuire, et al., 1979), stereotypes should be more active for the Black participants the less their race was represented in the group (i.e. the more distinct they were). Results confirmed predictions. The more participants were outnumbered, the more stereotypic completions they made. Our point here is that being outnumbered can increase awareness of one’s group and of the stereotypes associated with

one's group, and, ultimately, create a threatening environment where people expect stereotypes to be used against them.

ENVIRONMENTS CAN THREATEN INTELLECTUAL PERFORMANCE

Stereotype Threat

Environments that activate stereotypes might threaten intellectual performance via a motivational phenomenon known as stereotype threat (Aronson, 2002; Aronson et al., 1999; Spencer, Steele & Quinn, 1999; Steele, 1997; Steele & Aronson, 1995). Stereotype threat is the discomfort individuals feel when they are at risk of fulfilling a negative stereotype about their group. The possibility that they may confirm the stereotype—in their own and other people's eyes (Inzlicht & Ben-Zeev, 2003)—causes anxiety that is experienced as heightened physiological arousal (Ben-Zeev, Fein, & Inzlicht, in press; Blascovich, Spencer, Quinn, & Steele, 2001; O'Brien & Crandall, 2003). Ultimately this arousal may deplete working memory (Schmader & Johns, 2003) and result in sub-optimal performance, especially when individuals are highly identified with success and achievement in the stereotyped domain (Aronson et al., 1999). For instance, when faced with the stereotype that their group is not proficient in academic tests, African-Americans may feel anxious about being judged along stereotypical lines, and behave in a way that ironically confirms the very stereotype they were trying to refute; they may underperform. Interestingly, stereotype threat does not necessarily spring from actually being stereotyped and can occur even in the absence of stereotypical treatment. The key is holding a negative meta-stereotype about future treatment (Vorauer, Main, O'Connell, 1998), or put another way, *expecting* to be stereotyped.

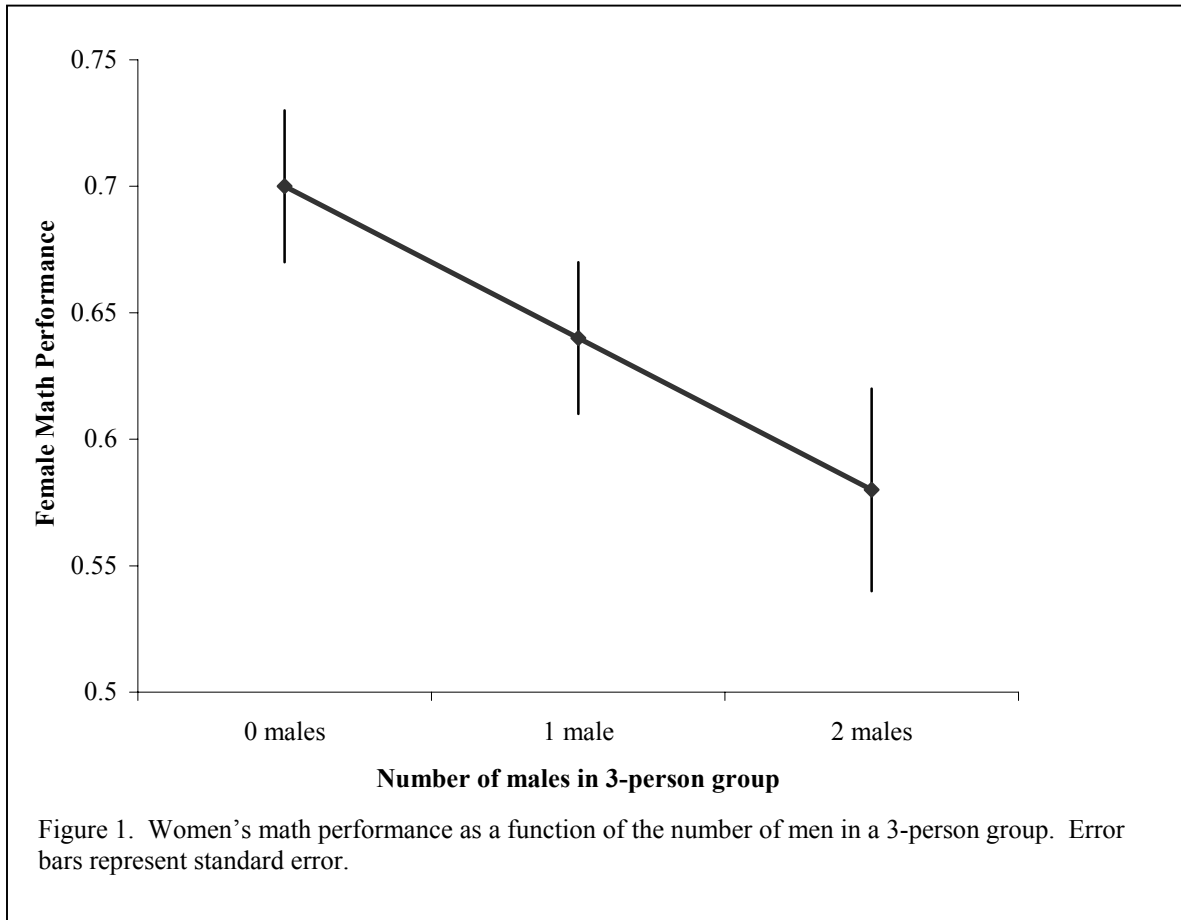
Women are also exposed to negative stereotypes about their group and are threatened by them accordingly. In math and science, for example, women have to contend with stereotypes alleging inferiority to men (Davies, Spencer, Quinn, Gerhardstein, 2002; Quinn & Spencer, 2001; Schmader, 2002; Spencer et al., 1999). Further, women often find themselves in the minority in math and science domains: Although they account for well over half of the student body, women form only a small minority of college students in the physical and computer sciences

(NSF, 2000). Given that minority environments¹ can activate negative stereotypes, it follows that they should also trigger stereotype threat and lead to depressed intellectual performance for women in math. Inzlicht and Ben-Zeev (2000) conducted a study to find out if this was indeed the case.

Minority Environments

In one study (Inzlicht & Ben-Zeev, 2000), women participated in a “focus-group study on test strategies.” Participants were seated with two other people—either two other women or two men—and told that they would take a math test, the results of which would be publicly discussed in the focus group. For women taking the test with two men, the mere distinctiveness of being in the minority should focus their attention on their gender, and along with it, the negative stereotypes about women and math. Conversely, women in the majority group should be less likely to spontaneously notice their gender and related stereotypes. In other words, being in the presence of two men should be enough to cause stereotype threat and lead to lower performance among women in a minority environment compared to women in a same-sex one. This is precisely what happened. A second study revealed that women performed worse when they were in the presence of even one man. Because social identity and stereotypes become more salient with increases in the relative number of out-group members in the environment (Inzlicht et. al., 2004; McGuire et al., 1979), it follows that women’s math performance would drop in relation to the number of men in the room. Figure 1 shows that when women took the math test in mixed-sex majority environments (with one other women and one man) they performed worse than women in a same-sex environment but better than women in a minority one. Therefore a seemingly innocuous contextual cue—the number of men in a room—can create a threatening intellectual environment and affect women’s math test performance. Similar results have been found with other stigmatized groups (e.g. Sekaquaptewa and Thompson, 2002).

¹ Researchers have used the terms “token”, “solo-status, and “minority environment” somewhat interchangeably to denote being outnumbered in an environment. Although similar, these terms have different meanings. Kanter defined (1977) the term “token” to denote individuals who belong to sub-groups that comprise less than 15% of the super-ordinate group. Furthermore, this term implies that one is chosen out of some symbolic gesture. “Solo-status” implies that one is the only member of one’s group. Finally, the term “minority” is often used to describe any non-dominant racial or ethnic group; in its strictest sense, however, the terms “minority” or “minority environment” denote numerical inferiority and are the terms we prefer.



So how, then, do minority environments threaten intellectual performance? One possibility is that being outnumbered can increase the distinctiveness of one's social identity, activate negative stereotypes, and then increase arousal. In other words, being outnumbered may increase feelings of apprehension, stoke the fires of arousal, and lead to underperformance as a result. Using the classic misattribution paradigm (e.g. Zanna & Cooper, 1974), Ben-Zeev and her colleagues (in press; Study 2) found that arousal—and an individual's construal of arousal—was a key ingredient linking minority environments to underperformance. In their study, women took a math test with either two men or two women. Half of the participants were also given the opportunity to attribute the negative arousal presumably triggered by the threat to a benign source—in this case, a subliminal tone. As expected, women in the minority environment performed worse on the math test than women in the same-sex environment. These minority performance deficits, however, were attenuated when the participants were given an opportunity to misattribute their arousal to an external source. When participants were told that a subliminal noise might make them feel anxious, minority participants performed as well as same-sex ones. Arousal, and the manner in which arousal is attributed, can therefore play an important role in mediating minority underperformance effects.

Threatening environments can also lower performance via lower performance expectations. In a study reported by Sekaquaptewa and Thompson (2003), women and men placed in virtual minority or same-sex groups were asked to estimate their performance before taking a math test. Results showed that women in the minority group had lower performance expectations than those in a same-sex group; men's performance expectations, in contrast, did not differ. Furthermore, the effect of minority environments on women's math performance was partly mediated by these lower expectations. Minority environments, therefore, may impugn intellectual performance by raising arousal and by lowering performance expectations.

Importantly, the effects of threatening minority environments on intellectual performance may be limited to groups operating in stereotyped domains. For example, even though a White man may be more likely to notice his race in a group of Black men and his gender in a group of White women, the stereotypes that these social identities are likely to activate may not be negative or threatening. Tokenism theory (Lord & Saenz, 1985; Saenz & Lord, 1989), on the other hand, suggests that being in the minority can cause cognitive deficits in all domains and for all groups, presumably as an outgrowth of the self-consciousness it causes. Performance deficits, in other words, are caused by feelings of general self-consciousness and not from stereotype activation. Although research supports both models, there is now converging evidence that minority situations are most threatening to groups dealing with negative stereotypes. Thus, although women and African-Americans do worse when outnumbered by White men, White men are unaffected when the situation is reversed (e.g. Inzlicht & Ben-Zeev, 2000; Thompson & Sekaquaptewa, 2002). Similarly, although businesswomen (Kanter, 1977) and policewomen (Ott, 1989) suffer as a result of being in the numerical inferiority, male nurses, librarians, and elementary school teachers, who are not stereotyped to be inferior, do not (Williams, 1992).

Other Devaluing Environments

Thus far we have focused on the environmental threats posed by the sex or race of fellow test-takers. Equally threatening is the race or gender of classroom instructors (Marx & Roman, 2002). For instance, upon noticing that most of their high school's math and science teachers are men, girls in a math class might wonder whether gender and science are intricately connected and ask if math and science are male-centered. For these girls, this "male-centeredness" may signal that their social identity has only marginal value and so may transform their class into a

threatening environment (Steele, et al., 2002). Marx and Roman tested this idea by examining whether a testing environment could become threatening by the mere presence of a male experimenter. In their study, an experimenter, who was either a man or a woman, administered a difficult math test to individual male and female participants. The presence of a competent male experimenter, it was hypothesized, would reinforce participants' notion of math as falling under the dominion of men and lead to impaired performance for women. On the other hand, the presence of a competent female experimenter would provide a counter-example to the stereotype about women's alleged difficulties in math and protect women's math performance. Experimenter gender, then, can signal how much import is placed on women's contributions and so can determine whether an environment is threatening and performance impugning. Results confirmed predictions: Women did worse with a male experimenter than with a female one, whereas men were unaffected by experimenter gender. A second study suggested that female experimenters were only effective in protecting women's math performance to the extent that they were perceived as competent and intelligent in math. It appears that a competent female experimenter—or instructor—sends the message that women can excel in domains in which they are negatively stereotyped, signals that women are clearly respected and esteemed in the setting, and disarms potentially threatening environments.

One does not need to take a class with a male instructor or attend a mostly White college to find threatening environments. One, in fact, need go no further than the living room for the pleasure of such an experience. For those households that indulge in a heavy diet of television consumption, one's own home can become threatening. A quick glance at the TV is all one needs to be inundated with images that reinforce racial, ethnic, and gender stereotypes. It is no surprise, then, that compared to light viewers, heavy television viewers believe that women have less ability and interests, and fewer career options than men (Gerbner, Gross, Morgan, & Signorielli, 1993). Watching TV—or reading magazines, listening to radio, surfing the Internet, etc.—can therefore foster threatening environments and impugn intellectual performance as a result. Davies and his colleagues (2002) examined this idea in a study on the effects of television commercials on intellectual performance. Men and women watched a set of either stereotypic commercials (e.g. a commercial portraying a woman “drooling” with anticipation to try a new brownie mix) or counter-stereotypic commercials (e.g. a women speaking intelligently about health care concerns) and then took a difficult math test. Before taking the test, but after watching the commercials, participants also completed a measure of stereotype activation. Even though the stereotypic commercials made no reference to the alleged difference in math ability, results revealed that women who watched stereotypic commercials did worse on

the math test than women who watched the counter-stereotypic commercials or than men more generally. Men, in contrast, were unaffected by the type of commercial they had seen. Furthermore, these test results were mediated by stereotype activation: The women who watched stereotypic commercials thought more about negative female stereotypes and did worse on the test as a consequence. Threats to performance, therefore, can literally be broadcast in the air.

ENVIRONMENTS CAN THREATEN ACADEMIC SELF-CONCEPT

Watching a stereotypical TV commercial, being outnumbered, or being taught by a member of the dominant group are not the only ways that environments threaten stereotyped individuals; and decreased performance is not the only way threat can manifest itself. Environments can also increase people's suspicions that they are being evaluated on the social prejudices that others hold against their group (Crocker & Major, 1989), and in the long run, become detrimental to the development of accurate, realistic, and stable knowledge about one's strengths and weaknesses (Aronson & Inzlicht, in press).

Discounting Feedback

Environments can increase people's prejudice apprehension, which is the extent to which a person anxiously expects, readily perceives, and intensely reacts to rejection that may be due to discrimination (Mendoza-Denton, Downey, Purdie, Davis, & Pietrzak, 2002). In a study by Inzlicht (2004), for instance, when Black participants were in three-person groups, they felt more apprehensive about being discriminated against the less their social group was represented in the group. In this study Black participants took a test as either one of one, two, or three Black participants in a three-person group. After the test, they completed a measure of prejudice apprehension (see Mendoza-Denton, Page-Gould, Pietrzak, this volume). Results showed that participants were more likely to expect and be bothered by discrimination the more Whites there were in the room. Thus, being outnumbered may enable suspicions of bias and discrimination, and lead people to be uncertain whether they are being devalued, marginalized, or discriminated against because of their social identity.

In their landmark paper on stigma, Crocker and Major (1989) called this state of uncertainty “attributional ambiguity” and defined it as the doubt that people have about the causes of their performances and the feedback they receive. For example, after failing a paper, a Black student may wonder whether she actually deserves the poor grade or discount it because she thinks her professor is racist. Because there are multiple possible reasons as to why she got the grade she did, she can discount internal attributions and minimize self-blame (Kelley, 1973; Major, Quinton, & McKoy, 2002).

Blaming one’s shortcomings on prejudice and discrimination can buffer people from many of the negative affective consequences of poor outcomes. In one study, Crocker, Voekl, Testa, and Major (1991) had Black and White college students participate in a study on “friendship development” with a same-sex White partner. Participants completed a self-description that was ostensibly given to their partner and then received either positive or negative interpersonal feedback. Half of the participants sat in a room with the blinds on a one-way mirror partially raised, whereas the blinds were down for the other half of the participants. Being in a room with blinds raised, it was hypothesized, would increase the visibility of the participant, subtly communicate group membership, and so increase the possibility that Black participants would attribute their outcome to prejudice against their group. In contrast, being in a room with blinds down would make it impossible for the White partner to know the participant’s race and thus would minimize the possibility that Black participants would feel like they were targets of discrimination. This is just what happened. Among Black participants, attributions to discrimination were higher if they thought their partner could see them and know their race than if their race was unknown. Furthermore, after getting negative feedback, they actually felt better about themselves—as reflected in self-esteem—if they could attribute the feedback to prejudice. White participants, on the other hand, were not affected by their visibility. Environments that signal that people may be judged along the basis of their social identity—threatening environments—can increase prejudice apprehension and therefore lead people to discount feedback and so become unaffected by it.

Inaccurate and Unstable Self-Knowledge

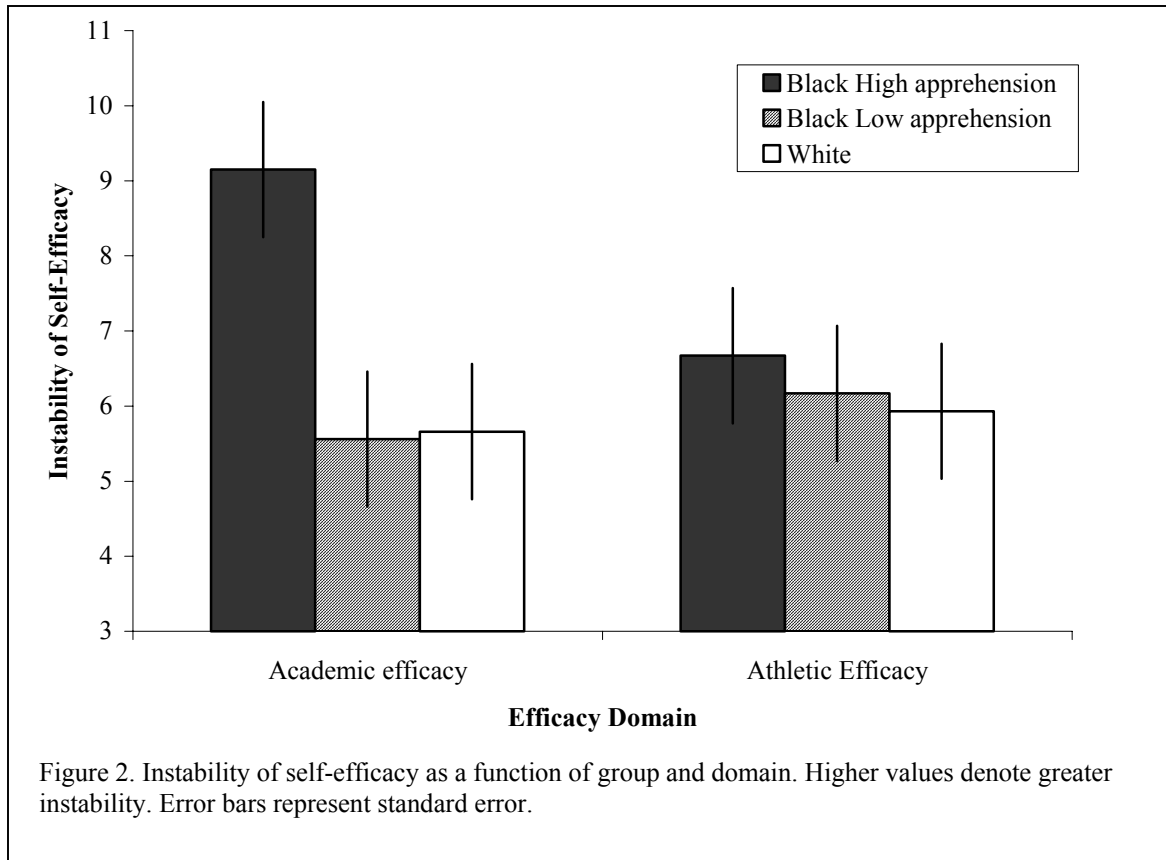
Although suspecting that the negative feedback one receives reflects prejudice and discrimination can protect self-esteem, it may also have negative consequences for self-knowledge. Specifically, it may also lead individuals to

disregard potentially instructive feedback, which can rob them of opportunities to learn about themselves from valuable sources of information. The more frequently one discounts feedback or writes off test scores as invalid, the less one can learn about one's underlying abilities. The uncertainty of attributionally ambiguous environments means that individuals belonging to stigmatized groups may have a difficult time developing a clear self-concept—that is, a stable and accurate conception of one's strengths and weaknesses (Major et al., 2002).

Aronson and Inzlicht (in press) tested this idea in a series of correlational studies. In their first study, Aronson and Inzlicht hypothesized that individuals who are high in prejudice apprehension would make assessments of their performances that are poorly “calibrated” with reality (Lichtenstein & Fischhoff, 1977). That is, those individuals who anxiously expect and readily perceive discrimination should judge their abilities in a way that corresponds very little with their actual abilities; those who expect and perceive less bias should judge their abilities more accurately. Black participants who were high or low in prejudice apprehension and White participants took a test composed of ten verbal items and then indicated the probability that each of their answers was correct. Results confirmed expectations. Black participants who were prejudice apprehensive were overconfident and had estimates of their ability that were more miscalibrated with reality than either Blacks who did not expect prejudice or than Whites more generally. Black students who have a history of discounting feedback, in other words, may not have the benefit of learning from feedback and thus remain overconfident and miscalibrated. Being wary of discrimination, then, is associated with inaccurate academic self-knowledge.

Another way to examine the self-knowledge hypothesis is to examine self-knowledge over time. People who have unclear academic self-knowledge do not really know how good or bad their academic skills are and may experience temporally unstable self-knowledge as a result (Kernis, Cornell, Sun, Berry, & Harlow, 1993; Wright, 2001). Aronson and Inzlicht (in press) therefore conducted a second study where Black participants who were high or low in prejudice apprehension and White participants completed diary measures of academic self-efficacy twice daily for two weeks. Being apprehensive for prejudice, they suspected, would be related to impaired self-knowledge, and along with it, unstable academic self-efficacy. In other words, because they do not really know how skilled they are, prejudice apprehensive individuals should have highly variable feelings of self-efficacy, sometimes feeling confident and other times not. In contrast, Black participants who are not prejudice apprehensive—or Whites more generally—should have feelings of self-efficacy that are more stable over time.

This is exactly what happened: Black participants who were prejudice apprehensive experienced more ups and downs in their feelings of academic competence than any of the other participants. Figure 2 shows, however, that apprehensive participants only experienced heightened instability in self-concepts related to stereotyped domains (i.e. academic performance). They did not suffer instability in non-stereotyped domains, such as in athletic self-efficacy.



Combined, these two studies show that although sensitivity to discrimination can protect self-esteem, it can harm the development of accurate and stable self-knowledge, both of which may be vital components of intelligence and goal-setting (e.g., Gardner, 1999; Sternberg, 1996). Further, given that minority environments can enable suspicions of bias and discrimination (Inzlicht, 2004), it follows that they may also allow people to discount negative feedback and so may threaten the accuracy and stability of self-knowledge as a result. Future research will need to examine this possibility.

ENVIRONMENTS CAN SEND EXCLUSIONARY MESSAGES

Thus far, we have seen how threatening environments can affect people's intellectual performance and, possibly, their academic self-knowledge. They can also, however, increase people's suspicions that they do not belong. Current research shows that environments that activate negative stereotypes can make people feel like outsiders and like their contributions do not matter. This is especially so when these stereotypic messages are coupled with messages about the immutability and fixedness of intelligence (Good & Dweck, 2003a), which can spring forth from the individuals who hold positions of authority in the environments; for example, from teachers in classrooms (Good & Dweck, 2003b).

Sense of Belonging

Building on research by Dweck and her colleagues on implicit theories of intelligence (see Dweck, 1999 for a review), Good and Dweck (2003a) wondered whether academic environments that suggest that intelligence is fixed could constitute a double threat to individuals who must also contend with negative stereotypes about their abilities, and thus foster feelings of unease and rejection. When a learning environment conveys the message of fixed intelligence, any failure within that environment is seen as a reflection of true ability, which makes stereotypes implying low ability more pejorative and more harmful to a feeling that one's social identity is valued and respected. Alternatively, contexts that portray skills as acquirable may create resiliency to the negative stereotype's debilitating message and send inclusionary, as opposed to exclusionary, messages. If the environment portrays the view that skills can be acquired through effort over time, then the stereotype of lesser underlying ability may become less credible and, consequently, less threatening (cf. Hong, Chiu, Dweck, Linn, & Wan, 1999; Mueller & Dweck, 1998).

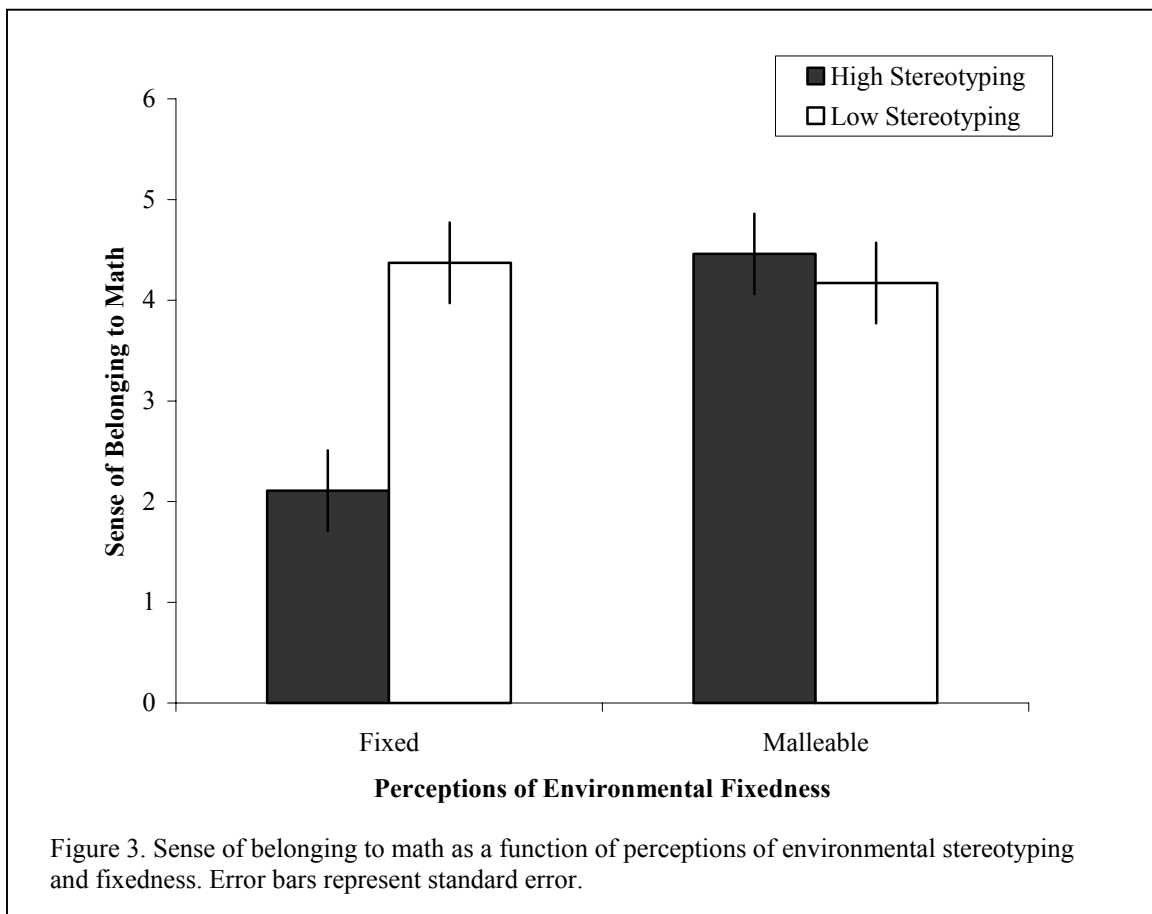
Furthermore, academic contexts that focus on fixed ability could, like stereotypes, undermine students' sense of belonging—their feelings that they are valued members of the academic community. These environments may insinuate that only those with high ability will be seen as valued members whose presence and contributions matter. And any slip in achievement or performance may be taken to indicate that a student is in fact inherently lower in

ability and consequently does not really belong to the academic community in which they are stereotyped. On the other hand, environments that foster the belief that competencies can be developed over time through effort may create room for many more people to be valued members, perhaps because a secure sense of belonging may depend more upon one's interest, commitment, and progress and less upon one's perceived ability (c.f. Butler, 2000; Hong, et al, 1999).

To test these hypotheses, Good and Dweck (2003a) conducted a longitudinal study of calculus students in which participants completed the Sense of Belonging to Math Scale at the beginning and end of the semester. The questionnaires also included measures of students' perceptions of whether their math classes sent messages of (a) fixed views of math ability and (b) gender stereotyping about math ability. Results showed that at the beginning of the semester, the most important determinant of women's sense of belonging to math was their prior math ability. Specifically, women with higher SAT scores reported a greater sense of belonging to math than did those with lower SAT scores. Over time, however, prior ability played less of a role and the educational environment played a larger one. By the end of the semester, women's perceptions of both the amount of stereotyping in their environment and the extent to which the environment was focused on fixed ability each independently undermined their sense of belonging to math. That is, female students with either of these perceptions felt less accepted, felt that others had lower expectations for them, felt a greater desire to fade into the woodwork, felt less trust of their learning environment, and had lower confidence in their abilities.

Although perceptions of gender stereotyping and perceptions of a fixed-ability learning environment each independently lowered women's sense of belonging to math, Figure 3 shows that together they interacted to constitute a double threat. Women who perceived both a fixed-ability learning environment and high gender stereotyping, not only had to contend with messages of fixed ability implied by the stereotype, but also messages of fixed ability fostered by the environment. It was precisely these students who were most susceptible to a lowered sense of belonging to math, regardless of their prior ability. Environments that portrayed skills as acquirable and expandable, however, created resiliency to the negative stereotypes' debilitating message. Learning environments that communicate that math ability is acquirable helped women maintain a sense of belonging to math even when they perceived their environment as highly gender-stereotypical. Thus, by the end of the semester, the effect of gender stereotyping on sense of belonging was moderated by the types of messages the environment communicated

about math intelligence—fixed-ability environments aggravated the effect and malleable-ability environments muted it.



Importantly, these results were based on women's *perceptions* of their environment and not on an objective measure of whether that environment actually promoted gender stereotypes or communicated that math intelligence is fixed. The point here is that regardless of their actual environments, women's subjective appraisals of those environments influenced their vulnerability to a decreased sense of belonging. The good news is that changing people's perceptions of their environment can be an effective tool to counter the effects of stereotype threat. For example, it may be possible to buffer the effects of stereotypes on sense of belonging by having people perceive their environment in a more benign way, say, by seeing that it promotes a malleable view of math intelligence. We examine this and other possibilities later in the chapter.

How Environments Send Threatening Messages

Whether an environment portrays the view that ability is fixed or malleable can determine whether it is seen as threatening or benign. But, how exactly do they convey such messages? One way to tackle this question is to look at the people who are in positions of authority in a given environment to see what types of messages they send. In a classroom, for example, we might examine what teachers say and think about intelligence to see how it affects students' perceptions of the environment. If teachers send the message that intelligence is malleable as opposed to fixed, perhaps this can create a safe environment where students reap the rewards conferred by a malleable theory. This possibility is currently being investigated (Good & Dweck, 2003b). Preliminary results suggest that when a novel math lesson includes a discussion about the hard work and effort that go into mathematical discovery, students perceive the instructor and the environment as holding malleable views of math intelligence. Alternatively, when the same novel math lesson includes statements about the genius of mathematical discovery, students perceive the environment as communicating a fixed view of math intelligence.

In a second study (Good & Dweck, 2003b), college students were primed with either a fixed or malleable view of intelligence and then asked to take the perspective of a math teacher who was returning math exams to their students. Participants read a scenario about either a female or male math student and were asked to indicate how likely they would be to implement a variety of pedagogical practices for the student in question. Preliminary results suggest that participants primed with the fixed view of intelligence had pronounced gender stereotyping that was expressed through their pedagogical practices. Participants primed with the malleable view, in contrast, showed less gender stereotyping. Fixed-ability participants, for example, were more likely to recommend that a student enroll in a gifted math program and join a math club when the hypothetical student was male as opposed to female. Participants primed with the malleable view, however, were just as likely to make these recommendations to males and females.

These results underscore the subtle ways in which a teacher's implicit theory of intelligence can direct the degree to which stereotyping is conveyed and so affect whether a classroom environment is seen as threatening or not. In combination, both studies show that teachers holding a fixed view of intelligence not only communicate that ability is fixed but also that they have different expectations for males and females. And as discussed earlier, holding gender stereotypes and a fixed view of intelligence forms a deadly combination by creating an environment that can affect motivational states—such as a decreased sense of belonging—and perhaps even performance (Good & Dweck, 2003a). There is, however, a silver lining to all of this: Given that malleable-intelligence environments

can buffer people from threats posed by negative stereotypes, it follows that instructors who teach this malleable view can foster an accepting and inclusionary learning environment and thus, reduce students' vulnerability to stereotype threat. This possibility is currently being investigated (Good & Dweck, 2003b).

OVERCOMING THREATENING ENVIRONMENTS

In this chapter, we've spent most of our time—perhaps even too much time (Seligman, 2002)—discussing how environments can hurt, threaten, and impede. For example, we have discussed how minority environments can evoke stereotype threat, how perceiving a fixed-ability learning environment can hurt feelings of belonging, and how being stereotype vulnerable—or possibly being in an environment that fosters stereotype vulnerability—can threaten self-knowledge. But what can we do to help people overcome these threats? How can we neutralize threats present in the environment?

Learning about the Malleability of Intelligence

One possibility, which builds upon Carol Dweck's work on implicit theories of intelligence (see Dweck, 1999), is to create environments where people are encouraged to view intelligence as a malleable quantity. A number of studies have addressed this possibility. In one study, for example, Aronson, Fried, and Good (2002) conducted an intervention in which college students were encouraged to adopt a malleable mindset about intelligence. In this study, both African-American and White participants were randomly assigned to one of three groups. The first group received training in order to view intelligence as something that can grow and increase with effort—the malleable view. To foster this view, they watched a film illustrating that the brain forms new connections and literally changes whenever you learn something new. Furthermore, they participated in a pen-pal program in which they wrote a letter to a struggling junior high school student and emphasized in their letters the idea that intelligence is expandable and increases with mental work. In the control groups, participants either received no treatment or a treatment about the many forms of ability. At the end of the semester, the group receiving the malleable intervention reported greater enjoyment of their academic work and greater valuing of academics in general. In

addition, this group showed a clear gain in grade point average over the other groups. Although these gains were apparent for all students in the study (both Whites and African-Americans) the gains were largest for the African-American students.

In a second study, Good, Aronson, & Inzlicht (2003) designed a similar intervention to investigate whether teaching junior high students about the malleable nature of intelligence could be used to reduce their vulnerability to stereotype threat and increase their standardized test performance. Specifically, boys and girls in the seventh grade of a low-income, predominantly Hispanic school participated in a year-long intervention where they were mentored by college students who taught them either that intelligence is expandable (experimental group) or about the perils of drug use (control group). At the year's end, the two groups' math and reading performance on a state-wide standardized achievement test was compared. Results indicated that the students in the malleable group received higher standardized test scores in both math and reading than students in the control group. Although the malleable intelligence manipulation helped all students, it was particularly beneficial for the stigmatized students—the Hispanic students in reading and the females in math. For example, in the malleable condition, the gender gap in math, evident in the control group, disappeared. These two studies therefore provide good evidence that interventions directed at students' key motivation-relevant beliefs could pay off by boosting intellectual performance.

Other Interventions

There are, of course, other remedies to the effects of threatening environments. Steele et al., (1997), for example, designed a “wise” schooling intervention for first-year students at the University of Michigan. Using mixed-race groups, students were “honorifically” recruited to the program by emphasizing that they had survived a very competitive admission process at the school, and that the University recognized their strong potential and had high expectations for them—all things that signal the insignificance of negative group stereotypes. Once in the program, students were reminded of these high expectations and challenged with weekly workshops on advanced material that went beyond material presented in most freshman classes. Several years of the program demonstrate that such practices can substantially increase the school performance of African-Americans. Uri Treisman's Emerging Scholars Program is another possible remedy. In this program, underrepresented groups in

mathematics, such as females, attend math workshops (in addition to their regular math lectures) that specifically redress some of the factors that make math threatening. The Emerging Scholars Program fosters an environment where students feel safe to explore new and unfamiliar ideas in math, the results of which are increases in performance and retention for women and other underrepresented populations (see College Board, 2001, for a review). Other things teachers can do include reducing the apparent diagnosticity of tests (Steele & Aronson, 1995) and increasing the number of minority teachers and role models (Marx & Roman, 2002; see Aronson, 2002, for a review).

CONCLUSION

Social psychological research shows us that our environments can be threatening. They can remind us of our social identities, activate negative stereotypes, and otherwise communicate that our groups are marginalized, devalued, and not accepted. When this happens people must cope with these pejorative messages, and the skill with which this is done can influence a number of important outcomes, including academic and intellectual performance, feelings of trust and belonging, and the accuracy and stability of self-knowledge. The good news that we hope has come through in this chapter is that the effects of threatening environments can be mitigated and that there is much that educators and policy makers can do to help. Once this is done, “counting” one’s social identity—as Arthur Ashe did—will no longer have the same negative repercussions.

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